THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

TOWNSHIP OF WEST FLAMBOROUGH

COUNTY OF WENTWORTH

1969

REPORT

ON A

SANITARY SURVEY

OF THE

TOWNSHIP OF WEST FLAMBOROUGH

COUNTY OF WENTWORTH

DIVISION OF SANITARY ENGINEERING

1969

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INTRODUCTION

A sanitary survey was carried out during the week of June 23 - 27, 1969 in eight subdivisions, two villages and one community located in Wentworth County in the Township of West Flamborough. Such surveys are carried out by the OWRC's Division of Sanitary Engineering in an effort to determine the adequacy of the existing water and sewage treatment facilities and presents recommendations concerning steps that should be taken in order to improve upon water and sewage treatment facilities in those areas where such improvements are neccesary.

I SUMMARY

A sanitary survey of the Township of West Flamborough was carried out during the week of June 23-27, 1969. The investigation revealed that a number of subdivisions located in the southeast portion of West Flamborough are suffering from a shortage of water. This, in conjunction with unsuitable bacteriological quality in a number of cases indicates the need for a municipal water supply system either located within the community or from an alternate source. Further investigation revealed that the majority of residences in West Flamborough disposed of domestic wastes by means of individual septic tank systems or, in a few cases, employed pit privies. It was noted that in the southeast portion of West Flamborough, clay

soil conditions limited the effectiveness of such systems.

II GENERAL

The Township of West Flamborough is located in Wentworth County and is triangular in shape. The eastern extremity is bounded by Highway No. 6, the southern by the Town of Dundas and the Township of Ancaster and the western extremity by Beverly Township.

Apart from a number of small commercial establishments and an open pit gravel operation, West Flamborough is basically agricultural. The 1968 population of West Flamborough as assessed in the 1969 Municipal Directory was 8,208.

The Township is drained by four creeks: the southern portion of West Flamborough is drained by Spencer and Rock Chapel Creeks, the northwestern portion by Grindstone and Bronte Creeks and the northeastern portion by North Spencer Creek.

Soil conditions in the Township range from red mudstone with underlying strata of greenish siltstone in the southeast to shallow soil and outcropping dolomite ridges in the northern portion of West Flamborough.

A more detailed description of the soil conditions in each area investigated can be found in Table I.

TABLE I

SANITARY SURVEY SUMMARY

LOCATION	BEDROCK TYPE	SOURCE OF WATER SUPPLY	DEPTH RANGE	AVAILABILITY OF POTABLE GROUND WATER	ALTERNATE SOURCE FOR FUTURE DRINKING WATER SUPPLY
ZELLENS SURVEY	RED MUDSTONE WITH OCCASION GREENISH SILTSTONE BANDS. WEATHERS RAPIDLY INTO A COHESIVE REDDISH SOIL ON EXPOSURE TO ATMOSPHERE.	A. DRILLED WELL B. DUG WELL C. HAULED IN (CISTERN)	75'	POOR	NO AVAILABLE GROUND WATER POSSIBLY BURLINGTON
PLEASANT VIEW SURVEY	SAME AS ABOVE	A. TRUCKED IN (CISTERN) B. DUG		POOR	SAME AS ABOVE
COMMUNITY OF MILLGROVE	SOILS ARE SHALLOW AND OUTCROPPING DOLOMITE RIDGES ARE QUITE COMMON	A. DRILLED WELL B. DUG WELL	60' - 100' 15' - 20'	FAIR	AVAILABLE GROUNDWATER
VILLAGE OF FREELTON	SAME AS ABOVE	DRILLED WELL	40' - 90'	GOOD	AVAILABLE GROUNDWATER
BROCK GARDENS SURVEY	LIGHT GRAY, BUFF WEATHERED DOLOMITES FLAT LYING TOPOGRAPHY SOILS WHEN PRESENT ARE USUALLY SHALLOW	DRILLED WELL	60' - 90'	GOOD	AVAILABLE GROUNDWATER
WEST SITE SURVEY	SAME AS MILLGROVE	A. DRILLED WELL B. DUG WELL	30' - 80' --	FAIR	AVAILABLE GROUNDWATER
GREENSVILLE	SAME AS MILLGROVE	A. DRILLED WELL B. DUG WELL C. SPRING	20' - 60' 12' - 23' --	GOOD	AVAILABLE GROUNDWATER
MARSHBORO HEIGHTS SURVEY	RED AND GRAY SANDSTONES AND SHALES GRAY SANDSTONE, DOLOMITE AND LIMESTONE TOPPED BY BLACK SHALE	A. DRILLED B. DUG	35' - 90' 30' - 40'	GOOD	AVAILABLE GROUNDWATER POSSIBLY HAMILTON VIA DUNDAS
GRAND VISTA HEIGHTS AND GARDENS SURVEY	SAME AS ABOVE	A. DRILLED B. DUG C. HAULED IN (CISTERN)	45' - 135' 15' - 25'	GOOD	SAME AS ABOVE
MC CORMICK PARK SURVEY	SAME AS ABOVE	A. BORED B. DUG	40' - 55' 10' - 15'	FAIR	AVAILABLE GROUNDWATER
SHERWIN COURT SURVEY	SAME AS ZELLENS SURVEY	DRILLED WELL	40' - 85'	FAIR	AVAILABLE GROUNDWATER

III SANITARY SURVEY

A sanitary survey was carried out by the District Engineer's Branch of the OWRC during the week of June 23-27, 1969. Information was obtained concerning existing water supply systems and methods of sanitary waste disposal. Bacteriological samples were obtained at every residence visited and chemical samples at selected points. A copy of the survey information sheets which were filled out at each inspection point is appended to the report.

IV A. RESULTS OF SANITARY SURVEY - BACTERIOLOGICAL

A summary of the number of adverse bacteriological samples as opposed to the total number of bacteriological samples obtained in each area is appended to this report and can be found in Table II.

Further, a list containing the results of the bacterlogical analyses performed on samples obtained from residences where drinking water contamination was present can be found in Appendix A.

Because of the many homes located in the areas under study, a representative number of bacteriological samples was obtained. In all, 99 bacteriological samples were collected,

representing approximately 15 per cent of the total number of residences. Of these, 28 indicated the presence of coliform organisms ranging from 129,000 coliform organisms per 100 ml to two coliform organisms per 100 ml.

Because of a potential health hazard created by the presence of such organisms the drinking water should be boiled for 15 minutes or suitably disinfected (chlorinated) prior to consumption.

IV B. CHEMICAL

The analyses results of the chemical samples obtained during the survey are contained in this report and can be found in Table III.

In all, five chemical samples were obtained from various areas in the Township where surface and subsurface soil conditions differed.

The analyses of the chemical samples obtained during the survey indicate the ground water is of satisfactory quality with the exceptions of hardness and iron. Complaints concerning problems associated with high iron levels were common in almost every area investigated. It is noted that a concentration of iron in water of 0.3 ppm and above, can cause taste problems, discolouration of clothing and plumbing fixtures and incrustations in watermains.

The hardness in the ground water ranges from 1300 ppm in the southeast portion of the Township to 430 ppm in the northern portion. The chemical sample obtained in Grand Vista Heights and Gardens Survey while only moderately hard (250 ppm) had an iron content of 2.50 ppm.

V SANITARY DISPOSAL SYSTEMS

Approximately 95 per cent of all homes use septic tank systems for the disposal of sanitary wastes. A small number of residences employ a grease trap for kitchen wastes and two or three of the homes visited use a pit privy for sanitary waste disposal. Generally, the disposal of sanitary wastes is satisfactory but there were a few cases where septic tanks had malfunctioned.

VI DISCUSSION

During the survey it was found that in the majority of cases the ground water serving the various communities was of satisfactory chemical quality. However bacteriological analyses results indicate the presence of coliform organisms in varying levels in many of the wells used as a source of drinking water. Contamination of private water supplies could be due to malfunctioning septic tank systems or faulty well seals and pumping equipment.

Most of the communities investigated had an adequate

supply of groundwater with the exception of Zellen's and Pleasant View Surveys where, in the majority of cases, drinking water is hauled in by tank truck. Installation of a municipal water supply system in communities such as the above is highly recommended. Methods of financing projects of this nature are appended.

At present the Township of West Flamborough has no official plan pertaining to the development of an adequate water supply system, for planned subdivisions.

Until a plan of this nature is made official, future subdivision development in West Flamborough can only be controlled by the present zoning laws employed by the Township. In order to eliminate isolated subdivision development, it is recommended that an official plan be drafted, limiting the development of subdivisions to areas only where adequate water services can be made available.

VII RECOMMENDATIONS

It is recommended that:

1. The OWRC should be notified by the Township of any future sites under consideration for the purpose of subdividing in order that a proper evaluation of water availability and soil conditions may be assessed.

2. An overall policy regarding subdivision development be established by the Township so that water supply and sewage disposal problems will not occur in the future.
3. Installation of communal well supplies be instituted in the areas where there is an inadequate drinking water supply and/or a major portion of the individual private well supplies are contaminated.

TABLE II

TOWNSHIP OF WEST FLAMBOROUGH

SANITARY SURVEY

SUMMARY OF BACTERIOLOGICAL RESULTS

Community	Samples Obtained	Adverse Samples	Percentage Adverse
Zellen's Survey	7	3	43
Pleasant View Survey	8	8	100
Community of Millgrove	8	7	88
Village of Freelton	10	2	20
Brock Gardens Survey	5	1	20
West Site Survey	6	2	33
Greensville	10	5	50
Marshboro Heights Survey	10	3	30
Grand Vista Heights and Gardens Survey	18	4	22
McCormick Park Survey	4	2	50
Sherwin Court Survey	10	7	70

Note: Adverse samples include bacteria other than coliform organisms (background colonies)

APPENDIX B

TOWNSHIP OF WEST FLAMBOROUGH

SANITARY SURVEY

SUBDIVISION Marshboro Survey

LOCATION MAP

NAME Mr. Allan McArthur

ADDRESS R.R. #1 Dundas

TYPE OF WELL Dug well (37') - used for everything

SEWAGE DISPOSAL

(a) Type Septic System

(b) Connections Everything

SAMPLES OBTAINED

(a) Chemical

(b) Bacteriological X

COMPLAINTS

(a) Quantity Nil

(b) Quality Nil

REMARKS No problems with septic system

Lot size 100' x 200'

APPENDIX C

IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMS

Currently, there are three general methods which may be utilized for implementing sewage and water works programs. These are: 1. to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, 2. by requesting the provision of service from a Provincially-owned project, and 3. by proceeding with the construction independently and meeting capital costs by the sale of debentures.

OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Sections 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of thirty years. The annual charges for projects consturcted under this agreement are determined as follows:

1. Capital Repayment

As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital cost is required to retire a debt over a thirty-year period.

2. Interest

On new Commission projects, interest is calculated at the current rate.

3. Reserve Fund

To provide money for repairs and replacements, Section 40 of the Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently earns interest. It has now been established by Commission minute that the reserve fund billing for each project shall continue only until the fund reaches an amound of ten times the initial annual billing and the reserve fund billing shall be re-imposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

4. Operating Costs

Under OWRC agreement, the municipality is responsible only for the operating costs directly attributed to the project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation and maintenance of the project.

PROVINCIALLY-OWNED WORKS

In June, 1967, the Honourable J.R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new program allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40 year period.

A slight variation of this program could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as Provincially-owned works, and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that where applicable, it would be more advantageous for the municipality to proceed

on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the affected municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes this Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a resolution of the Municipal council. A draft of the suggested wording of the resolution is included with the application forms.

If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the Council retain a consulting engineer to prepare preliminary engineering reports on the proposed work. If a Provincial system is

contemplated, no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.

APPENDIX D

SIGNIFICANCE OF LABORATORY ANALYSES

Bacteriological Examination

The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. The objectives for surface water quality in Ontario is a maximum of 2400 organisms per 100 millilitres.

The OWRC Laboratories employ the Membrane Filter (MF) technique of examination to obtain a direct enumeration of coliform organisms. The Department of Health Laboratories use the Most Probable Member (MPN) enumeration and coliform counts are reported as Total Coliform Organisms (TC) and Faecal Coliform Organisms (FC).

Sanitary Chemical Analyses

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (PPM) and is an indicated of the amount of oxygen required for the stabilization of decomposable organic or chemical matter in water. The completion of the laboratory test required five days, under the controlled incubation temperature of 20° Centigrade.

The OWRC objective for surface water quality is an upper limit of four (4) ppm.

Solids

The value for solids, expressed in parts per million, is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended solids is generally

the most significant of the solids analyses with regard to surface water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, decomposition in streams and injury to the habitat of fish.

Nitrogen

Ammonia Nitrogen or sometimes called free ammonia is the insoluble product in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia, too, may be swept out of the atmosphere by rain water.

The following values may be of general significance in appraising free ammonia content: Low 0.015 to 0.03 ppm; moderate 0.03 to 0.10 ppm; high 0.10 or greater.

Total Kjeldahl is a measure of the total nitrogeneous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl less the Ammonia Nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range for Total Kjeldahl would be 0.1 to 0.5 ppm.

Nitrite Nitrogen

Nitrite is usually an intermediate oxidation of ammonia. The significance of nitrites, therefore, varies with their amount, sources, and relation to other constituents of the

sample, notably the relative magnitude of ammonia and nitrite present. Since nitrite is rapidly and easily converted to nitrate, its presence in concentrations greater than a few thousandths of a part per million is generally indicative of active biological processes in the water.

Nitrate Nitrogen

Nitrate is the end product of aerobic decomposition of nitrogenous matter, and its presence carries this significance. Nitrate concentration is of particular interest in relation to the other forms of nitrogen that may be present in the sample. Nitrates occur in the crust of the earth in many places and are a source of its fertility.

The following ranges in concentration may be used as a guide: low less than 0.1 ppm; moderate 0.1 to 1.0 ppm; high greather than 1.0 ppm.

Anionic Detergents as ABS

The presence of anionic detergents as ABS is an indication that domestic waste is present.

Phenols

The presence of phenol or phenolic equivalents is generally associated with discharges containing petroleum products, or with wastes from some industries. It is generally conceded that adequate protection of surface waters will be provided if the concentration of phenols in waste discharges does not exceed

20 parts per billion (ppb). Phenolic type waste can cause objectionable conditions in water supplies and might taint the flesh of fish.

Iron

Water for domestic use should contain less than 0.3 parts per million of iron in order to avoid objectionable tastes, staining and sediment formation. Iron concentrations of not greater than 17 parts per million in waste discharges should permit adequate protection of surface waters.

APPENDIX A

TOWNSHIP OF WEST FLAMBOROUGH

SANITARY SURVEY

BACTERIOLOGICAL RESULTS

COMMUNITY	TOTAL SAMPLES	LOCATION	ADVERSE SAMPLES: TOTAL COLIFORMS ORGANISMS/100 ML	ADVERSE SAMPLES: FAECAL COLIFORMS ORGANISMS/100 ML
VILLAGE OF FREELTON	10	MR. MCCARTHY	2	0
COMMUNITY OF MILLGROVE	8	MR. J. GERITSEN	14	0
		MR. F. CAMPBELL	4	0
		MR. G. FRANKUM	4	0
		MR. E. MUELLER	24	0
		MR. W. MCKAY	129,000	18
		MR. H. POLAK	22	4
		MR. STEWART	4	0
VILLAGE OF GREENSVILLE	10	MR. FENTON	134	0
		MR. B. SHEPPARD	48	4
GRAND VISTA HEIGHTS AND GARDENS SURVEY	18	MR. B. RICKELL	490	10
BROCK GARDENS SURVEY	5			
MCCORMICK PARK SURVEY	4	MR. A. KAMPMANN	48	0
		MR. J. VANDERHEIDEN	26	0
ZELLEN'S SURVEY	7	MR. J. VERWAAL	8	0
PLEASANT VIEW SURVEY	8	MR. L. FOFFANO	340	28
		MR. S. FITZPATRICK	112	0
		MR. R. TOLMIE	100	14
		MR. R. SCOTT	200	6
SHERWIN COURT SURVEY	10	MR. WEBERLY	3,300	26
		MR. ANDREYCHUK	2	0
		MR. HEINEN	2	0
		MR. B. TOWNSEND	12	12
		MR. K. PATTERSON	36	0
		MR. R. FINN	6	0
MARSHBORO SURVEY	10	MR. A. MCARTHUR	10	0
		MR. WARBY	52	0
WEST SITE SURVEY	6	MR. ARMITT	14	0
		MR. SHIVISH	2	0

NOTE: OUT OF A TOTAL OF 99 BACTERIOLOGICAL SAMPLES TAKEN DURING THE SURVEY

A. 28 WERE ADVERSE (LISTED ABOVE)

B. 16 INDICATED THE PRESENCE BACTERIA OTHER THAN COLIFORM ORGANISMS (BACKGROUND COLONIES)

C. 55 WERE OF SATISFACTORY QUALITY

TABLE III

TOWNSHIP OF WEST FLAMBOROUGH

SANITARY SURVEY

SUMMARY OF CHEMICAL RESULTS

COMMUNITY	HARDNESS AS CaCO3	ALKALINITY AS CaCO3	IRON AS Fe	CHLORIDE AS Cl	PH AT LAB	FLUORIDE AS F	APPARENT COLOUR UNITS	TURBIDITY UNITS	CYANIDE AS HCN	COPPER AS Cu	CADMIUM AS Cd	CHROMIUM AS Cr
SHERWIN COURT SURVEY	1300	400	0.15	448	7.2	0.6	< 5	1	< 0.01	0.0	0.02	0.0
WEST SITE SURVEY	430	257	0.05	55	7.3	0.1	< 5	1	0.0	0.0	0.02	0.0
MARSHBORO SURVEY	382	223	0.05	51	7.1	0.1	< 5	1	0.0	0.0	0.02	0.0
COMMUNITY OF MILLGROVE	716	187	0.50	61	7.5	0.8	5	2	-	0.0	0.0	0.0
GRAND VISTS HEIGHTS AND GARDENS SURVEY	292	255	2.50	3	7.6	0.2	30	-	0.02	-	-	-

TABLE III (CONT'D)

MANGANESE AS MN	ZINC AS ZN	ARSENIC AS AS	BARIUM AS BA	SELENIUM AS SE	SILVER AS AG
0.02	0.73	0.0	< 5	< 0.005	0.0
0.01	0.10	0.0	< 5	0.0	0.0
0.0	0.70	0.0	< 5	0.0	0.0
0.0	-	-	-	-	0.0
0.0	0.0	0.0	< 5	< 0.01	-

APPENDIX E

INTERPRETATION OF BACTERIOLOGICAL RESULTS

Coliform Bacteria

Coliforms are the main bacterial indicators of polluted water (drinking and bathing) although other groups will at times be used to further define the degree of impairment.

Absence of Coliforms

The absence of coliform bacteria in a 100 ml sample of water indicates water of satisfactory quality for human and animal consumption.

One to Ten Coliforms

One to ten coliform bacteria in a 100 ml sample of water indicates that some sewage or soil bacteria are present. This level of contamination in water is not usually regarded as dangerous for drinking purposes. However, a second sample collected in a suitable sterile container should be submitted immediately to substantiate the water quality. The water source should be examined for possible access of contaminating materials.

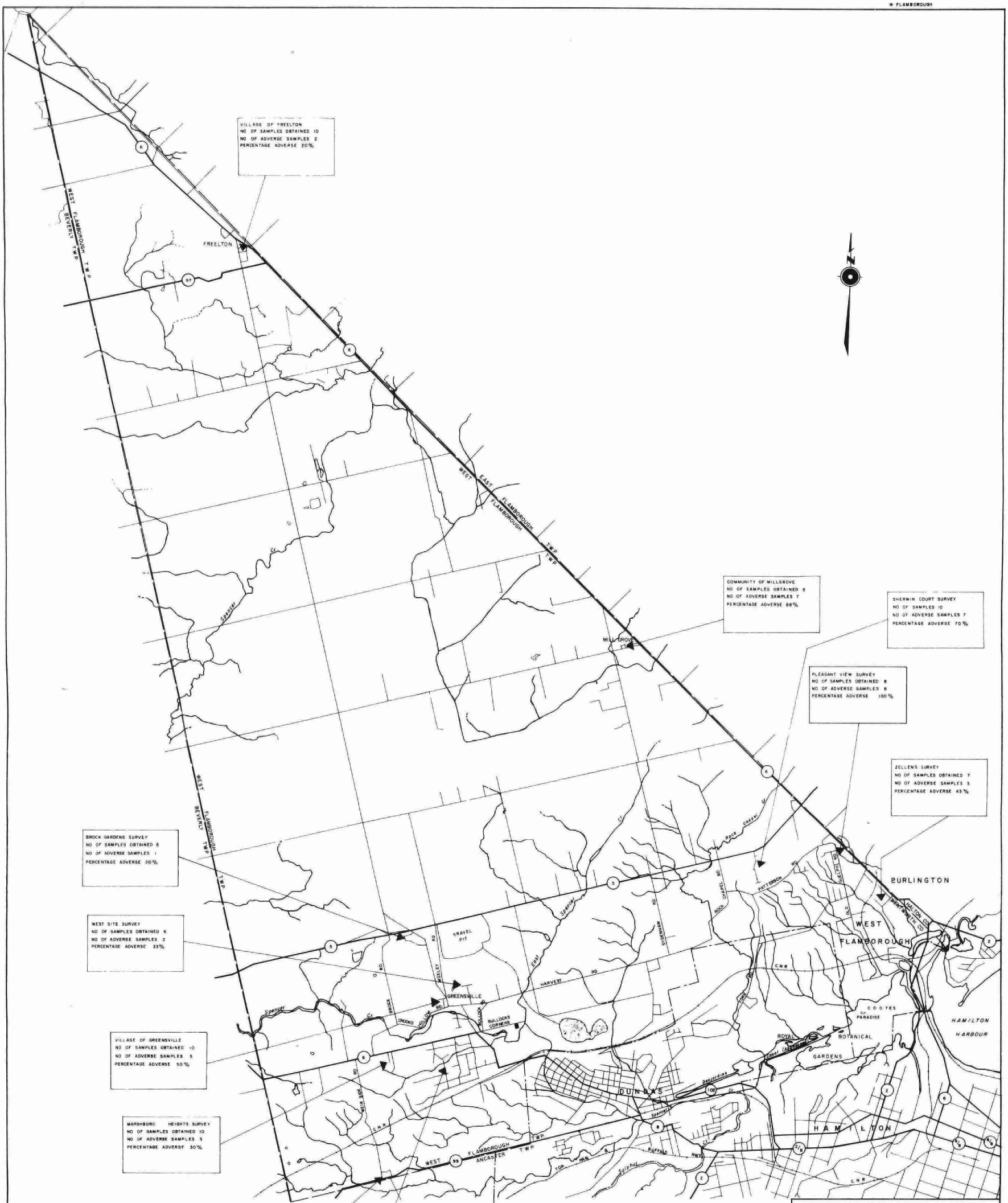
More than Ten

When more than ten coliform are present in 100 mls of sample, the water can be suspected of containing sewage of soil bacteria that may be injurious to health. Such water should not be consumed. Following disinfection and elimination

of the sources of contamination, a second sample should be submitted to re-assess the safety of the water.

General

Variations inherent is sampling procedures and in the distribution of bacteria in water do not permit absolute judgement of the quality of a water source based on the analysis of a single sample. The Membrane Filter technique is generally used to analyse samples.



ONTARIO WATER RESOURCES COMMISSION

TOWNSHIP OF WEST FLAMBOROUGH
SANITARY SURVEY
JUNE, 1969

SCALE 1/2 0 1/2 1 MILE	
DRAWN BY L. L. BROOME	DATE JULY, 1968
CHECKED BY W. MERRITT	DRAWING No. 69-99-DE

Dept
Environ
Water Treat

Water pollution survey
Dept Flamborough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